

# OBSERVATIONS ON MOSQUITOES IN THE ISLE OF MAN

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## PLATES X—XIV

In recent years much interest has been shown in the mosquitoes of the British Isles, and many new observations have been made which increase our knowledge of the species which occur here. Twenty-two species, including three members of the genus *Anopheles*, have now been recorded from the United Kingdom, and many of them are also known to occur in Ireland; but, so far as we are aware, no information concerning the mosquitoes of the Isle of Man is available. Having recently had occasion to visit the Island, we took the opportunity of investigating the occurrence and distribution of mosquitoes. As, however, our visit extended over only a portion of November and December, it was impossible to make any detailed investigation of even those mosquitoes of which the over-wintering stages are known and readily found. Our activities were for the most part confined to localities easily accessible by railway or tramway, and were, therefore, mainly limited to the coastal region. The places visited and the records obtained are shown in the appendix and map.

### GENERAL CONSIDERATIONS

#### I. ANOPHELINE MOSQUITOES.

*A. bifurcatus*, L. The larvae of this species were abundant and widely distributed over the Island, and were found without difficulty in spite of the fact that residual breeding-places only could be discovered at this time of the year. As is sometimes the case with mosquitoes of this kind, larvae were found in certain of the breeding-places only after considerable searching; this was especially noticeable in the more extensive breeding-places, such as the marsh-

land (Photo. No. 1) in the neighbourhood of Ballaugh and Sulby. On the other hand, relatively large numbers were sometimes obtained in a short time in the more circumscribed waters, such as the artificial pond at Groudle Glen (Photo. No. 2) and in the ditch at Castletown (Photo. No. 3). In the latter case, in the small ditch shown on the right of the photograph, over sixty larvae were captured in ten minutes by one person using a small scoop. As will be seen in the photographs, breeding-places of *A. bifurcatus* were found in various types of country, even close to the sea (Photo. No. 4); they occurred also in situations where free water was only discovered by close inspection and was chiefly limited to hoof prints, etc. (Photo. No. 5). They were also found in the near neighbourhood of towns, as shown in Photo. No. 6 (Appendix, No. 15).

*A. maculipennis*, Mg. Hibernating females of this mosquito were not found in such large numbers as (in view of the numerous potential breeding-places observed) we expected. All types of cow-sheds, stables, and other out-buildings from those of modern construction—high-roofed, well-lighted and well-ventilated—to those of primitive form—small, dark and badly ventilated—were systematically examined; it was naturally impossible, however, to obtain access to houses, and, therefore, it is not possible to give records relating to them. In only one case (Appendix, No. 21, Photo. No. 7) was any considerable number of females found, when one hundred and forty-seven were captured, this representing the great majority of those present in the building. In accounting for the relatively small numbers seen, the following two facts, which came under our notice, are possibly of some importance:—

1. Cleaning and lime-washing. In several instances we were informed that a thorough sweeping of the walls and roof to remove cobwebs had recently been carried out; this procedure in some cases had been followed by lime-washing.

2. Accidental cleaning of the roofs. Having observed in some cowsheds and stables with low flat roofs that cobwebs existed only in the corners, or over the manger, we made enquiries as to the reason of this. It is to be attributed to the practice of carrying on a fork the hay used as fodder, thus repeatedly brushing the greater portion of the roof.



PHOTOGRAPH NO. 1



PHOTOGRAPH NO. 2

*A. plumbeus*, Steph. Although the Isle of Man is by no means heavily wooded, we experienced little difficulty in discovering the larvae of *A. plumbeus* on numerous occasions. The breeding-places were similar in nature to those of which we have given illustrations in our previous papers (1920). We found here a surprising difference in the tendency of the Spanish chestnut (*Castanea sativa*) to form rot-holes, and although no systematic survey was carried out, yet of nineteen breeding-places discovered, four occurred in this species of tree; whereas in Liverpool and district, of sixteen breeding-places found, none were present in the Spanish chestnut. Photo. No. 8 displays the most interesting breeding-place of this mosquito that we have yet discovered; a full description of it is given on p. 87 (No. 34). Interesting breeding-places were also found immediately adjacent to an out-door latrine (Photo. No. 9) at a country farmstead, and near the centre of a town as in Photo No. 10 (Appendix, No. 31 f).

It is necessary to note here that in no instance were the larvae of *Ochlerotatus geniculatus*, Ol., discovered. So far as our investigations have gone, although we have commonly found this species in the United Kingdom in association with *A. plumbeus*, we have entirely failed to find it either in Ireland or the Isle of Man, although *A. plumbeus* is abundant in both places.

## II. CULICINE MOSQUITOES.

*Culex pipiens*, L. Females of this species were found in several of the localities in which buildings were visited. They were frequently found associated with *A. maculipennis* in occupied cowsheds, stables and piggeries, but were distinctly more numerous in cooler situations, *i.e.*, cellars, lofts, out-houses, etc. (Appendix, p. 88).

*Theobaldia annulata*, Schr. Larvae, pupae and adults of this mosquito were discovered in various places. The adults were relatively uncommon, but females were occasionally found in buildings, and, on one occasion (November 18th), both sexes were emerging from pupae contained in a wooden tub. This was standing in the back garden of a cottage at the Nunnery Mill, Douglas; the position of the tub in relation to the cottage is seen in Photo No. 11. The dimensions of the tub were 18 inches in top

diameter and 12 inches in depth; it was nearly full of rain water, which, on being stirred, produced a very evil odour due to a mass of putrifying leaves lying on the bottom; no larvae were found. Eighty-four pupae were collected from the tub, and from seventy-eight of these, twenty-seven males and fifty-one females emerged. Pupae of *T. annulata* were also found at Ramsey on November 22nd, in a marshy meadow situated behind the town (Photo. No. 6). Larvae of the second, third and fourth instars were abundant, and occurred in several different types of breeding-place (Appendix, p. 88).

*Culicella morsitans*, Theo. Larvae of various sizes were found; they sometimes occurred with the larvae of *T. annulata*, but were more definitely limited in regard to habitat. They were always found in open water containing abundant vegetation, and, in marshy land, appeared to favour more particularly the immediate neighbourhood of clumps of rushes (Appendix, p. 89).

*Culicella fumipennis*, Steph. Larvae of this species were found in one locality only, namely, in the extensive peat bog-land or 'curragh' in the vicinity of Ballaugh. They were, however, taken in two sites, but the nature of the breeding-places in regard to the types of vegetation present and colour of the water (reddish-brown) appeared identical. These larvae, some of which appeared but half-grown, were of a characteristic yellowish colour, and could immediately be distinguished from those of *C. morsitans*, which were darker and distinctly brown (Appendix, p. 89).

#### APPENDIX, GIVING RECORDS OF SPECIES OBTAINED, UNDER PLACE NAMES ARRANGED IN ALPHABETICAL ORDER

##### *Anopheles bifurcatus*, L.

(1) BALLAUGH, December 6th.

(a) The country immediately north of the railway to the East of Ballaugh Station presents features which are peculiar to this portion of the Island. It is a flat, desolate marshy country, with large expanses of water interrupted by collections of low bush and reeds. In Photo. 1, which gives a good idea of the appearance of much of this region, known as 'the Curragh,' the foreground represents an area adjoining the path, completely waterlogged and



PHOTOGRAPH NO. 3



PHOTOGRAPH NO. 4



PHOTOGRAPH NO. 5



communicating with the open water beyond. Larvae were found among the coarse grass seen in the foreground of the picture, but it was impossible to make any observations on the open waters.

Besides this breeding-place, two others were found of quite a different character.

(b) One was a pond in a field where the peat formation of the district was observed at the edges of the pond itself, and also in the brown discolouration of the water. Here larvae were obtained after breaking ice one-eighth inch thick.

(c) The other was near the railway line close to the station, and was a cutting for water, having a high bank, formed by the railway track, on one side. The water was clear and flowing, but in shallow areas at the margin, where grass, duckweed and watercress provided shelter, larvae were numerous.

(2) CASTLETOWN, November 30th.

(a) Near the public park, and separated from it by the river (Silver Burn), is a meadow with a stream running through it; this stream at the time of our visit was overflowing at various points, covering a large area with shallow, stagnant water. Only at one end of the flooded area, in a boggy patch, with hoofprints, was a single larva obtained after considerable searching, and none was found in the stream itself, which was moving fairly rapidly.

(b) In striking contrast to the absence of larvae from the centre of the meadow, was their abundance in a narrow ditch on the side remote from the river (Photo. 3).

In the photograph the ditch in question is on the right, while the flooded area extends to the left for a considerable distance outside the picture. In this ditch, which varied in width from 3 feet to about a foot in some parts, and which was a foot deep with overhanging banks, sixty larvae were collected in ten minutes by one person using a small scoop. The vegetation was chiefly grass and watercress, and from the abundance of life of various kinds present we were led to conclude that this formed a permanent and very suitable breeding-place for *A. bifurcatus*.

(3) DOUGLAS, November 18th.

In the neighbourhood of Douglas outside the Nunnery estate, about twenty minutes' walk from the quay, an extensive breeding-

ground is present. It is that portion of flat land which lies to the right of the path outside the Nunnery towards the racecourse. The only indication of the marshy nature of this ground was the appearance of reeds, as the water was concealed by the vegetation and was not visible even at a few yards distance.

The area is approximately 120 yards by 35 yards, and is continuous with a similar area not examined by us on the left of the path, where it turns towards the racecourse. In the area under consideration larvae were constantly found on testing in various directions at five-yard intervals, very frequently in hoofmarks. Beyond this field, across the hedge towards the racecourse, is what appeared at first sight to be a continuation of the same sort of half marshy ground, but the water present was red and contained a great quantity of flocculent material. No larvae were found here despite prolonged testing.

(4) GLEN GARWICK ROAD, November 19th.

No larvae were found actually in this glen, although a swampy patch just in front of the hotel was regarded as promising, but a breeding-place occurs beside the Electric Tramway line from Groudle, just beyond the level crossing past Liverpool Arms Hotel to the left of the line going towards Garwick. Larvae were found here in a field which was marshy, and their distribution appeared to coincide with the occurrence of patches of duckweed.

(5) GLEN GREENAUGH, December 1st.

In a pond on the property of Balla Vale, just above the weir across the stream, larvae were found in small numbers. The pond contained a large quantity of dead leaves, and at one end where larvae were found grass was present; it is situated about 150 yards from the house.

(6) GLEN GROUDLE, October 28th and November 16th.

(a) On the occasion of the preliminary visit, a large breeding-place was found in the glen in the shape of an artificial pond which lies between the path and the river, and which is used as a fernery. The breeding-place is 80 yards long by 25 yards across at its widest part, and is situated about 500 yards from the viaduct. The pond is sub-divided into what is practically a series of small ponds by





PHOTOGRAPH No. 6



PHOTOGRAPH No. 7

means of banks of considerable width. Larvae were found with ease all over the area. The vegetation consists of coarse grass, reeds, waterlilies and, on the banks, ferns (Photo. 2).

(*b*) On the second visit, by passing down the glen, we found a breeding-place at Groudle Creek in close proximity to the sea, separated from it, in fact, only by a bank of shingle and the banks of the river itself; it is seen in Photo. No. 4.

From its proximity to the sea and from the presence of much seaweed and flotsam in this collection of water, we concluded that it must contain a considerable excess of sodium chloride, and the water had a brackish flavour; but analysis\* showed that, in fact, it contained only 7.63 parts per 100,000, which is stated to be lower than many potable waters of the Isle of Man.

This breeding-place, which was about 30 yards from the sea and 100 yards from the nearest croft, did not yield numerous larvae.

(7) GLEN LAXEY, November 20th.

Close to the entrance to Laxeey Glen Gardens there is a boggy-looking field on the left of the path, in which larvae were found. The field is bordered by a wall (seen in Photo. 5), which separates it from the bandstand and pleasure ground. To the right of the position seen in this photograph are various swings and apparatus for the amusement of the numerous children visitors. The hotel lies behind the camera to the right at a distance of about a hundred yards.

It may be noted again here that even at a short distance the presence of water could not be perceived, but could only be inferred from the character of the vegetation.

(8) GLEN SULBY, December 7th.

The Curragh region mentioned above in connection with Ballaugh extends towards Sulby Glen, and can be approached from this point.

(*a*) At the edge of the Curragh larvae were found in a field surrounded by stagnant ditches. The centre of the field was swampy and larvae were found here, and, where the water was clear among the reeds, in one of the ditches bordering the field; in two

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\* Kindly carried out for us by Mr. Fyffe of the Public Analysts Laboratory, Douglas, Isle of Man.

other ditches, where the water was loaded with red flocculent material, no larvae were discovered.

(b) Another breeding-place was found in Sulby itself, about 400 yards from the Glen Hotel. It was a marshy piece of ground beside the road, and was bordered on the far side by an area of higher ground where many trees had recently been cut down. The photograph showing this breeding-place of *A. bifurcatus* shows also a very uncommon breeding-place of *A. plumbeus*, and will be found under the latter heading, Photo. 8.

(9) GLEN WILLYN, December 7th.

In the terminal part of this glen, about 300 yards from the sea, there are pleasure grounds furnished with bandstand, swings, etc. These abut on the small stream, and just opposite them is a narrow wet strip of ground at the foot of a steep hill. In this wet area larvae were found in that portion adjacent to the fence which runs along the side of the stream, and separated from the pleasure ground by only the width of the stream.

(10) GREEBA, December 5th.

The railway from Douglas to Peel runs in a valley for a considerable portion of the way. The land close to the railway is marshy, and has at intervals much free water lying on it. This strip of wet land was examined in the region of Greeba, and there was no difficulty in finding larvae.

(11) PEEL, December 8th.

Larvae were found in a small narrow drain at the foot of the hill bordering the road along the quay on the way to Peel Castle. The water was sluggish and much grass was present in many places.

(12) PORT ERIN, November 26th.

Three breeding-places were discovered in this locality.

(a) The first was in marshy ground in the valley near the far end of the golf course.

(b) The second was a slow-moving stream with high banks and much vegetation, chiefly grass and watercress situated between Port Erin and Ballafesson village.

(c) The third was a small piece of marsh land covered with reeds in the centre of the village of Ballafesson.



PHOTOGRAPH No. 8



PHOTOGRAPH No. 9

## (13) PORT SODERICK, December 5th.

About half a mile before Port Soderick, on the road from Douglas, beside the road a breeding-place was found. It consisted of a pool of clear water, deep in the centre with a rapid streamlet running through it. The vegetation was considerable, and consisted of a fairly thick layer of duckweed which covered the centre of the pool and reached to within a few inches of the edge in most places. The edges were covered with grass and duckweed. The larvae were present in numbers, and were found chiefly near the edges.

## (14) PORT ST. MARY, November 29th.

Close to the station, in a meadow belonging to Ballacreggan Farm, just behind the gas works, a small ditch a foot wide, overgrown with grass and not conspicuous, proved to contain larvae. The water was clear and had a few patches of duckweed on it at intervals, and the surface of the water was about a foot below the level of the banks, which were undermined.

## (15) RAMSEY, November 22nd.

An excellent breeding-place was encountered on the outskirts of the town. The extent of this area, a marshy field, is 120 by 120 yards, approximately. Very numerous larvae were found here. Situated about 15 yards away is the playground of a large school, which can be seen in Photo. No. 6. In the whole of this area larvae were found.

## (16) ST. JOHN'S, December 8th and 9th.

(a) Larvae were found in a pool in a field adjacent to the station. This pool serves partly as a cesspool for drainage from the station lavatories; it is situated 10 yards from the platform, 6 yards from the lavatories and about 30 yards from the main road. The water was slightly coloured, the margins very boggy, and the vegetation mostly rushes with some duckweed and grass.

(b) On the road from St. John's to Peel, in a field on the right side of the road about half a mile out of St. John's, larvae were found in the margins of a narrow, rapid stream at the foot of a hill.

(c) Further on the road, about a quarter of a mile beyond this breeding-place, a considerable amount of marshy ground exists at

the side of the railway. There is an extensive breeding-place between the railway and the St. John's-Knockaloe Road, the edge of the marshy ground lying 100 yards distant from the nearest farmstead.

*Anopheles maculipennis*, Mg.

A number of cowsheds, stables, piggeries, fowl-houses, latrines, outhouses, cellars, lofts, sheds and shelters of various kinds were examined with a view to finding the adults of this mosquito.

(17) BALLAUGH, December 6th.

(a) Three cowsheds were examined, of which two were small, dark, warm, flat-roofed, with numerous cobwebs present, and the third lofty, well-lighted, with gable roof and almost free from cobwebs. In one of the former, three, and in the last, one *A. maculipennis* ♀ were captured. Total 4 ♀

(b) One stable of modern construction, with high gable roof, but rather dark ... .. 2 ♀

(18) CASTLETOWN, November 30th.

(a) One cowshed, small, dark, warm, low-roofed, situated in the centre of the town ... .. 10 ♀

(b) One stable for two horses, in centre of town, low-roofed and warm, with few cobwebs except in one corner ... 3 ♀

(c) One outhouse adjoining stable, and of same construction, used as a potato store, cooler and draughty ... .. nil.

(d) Two lofts; one warm, dark, slate-roofed, with few cobwebs, situated over (b) and (c), nil; the other situated above (a), dark, slate roof, numerous cobwebs, 1 ♀. Total 1 ♀

(19) DOUGLAS, November 18th.

At the Nunnery Mill the following were examined:—

(a) Stable, a large, dark stable on ground floor, just being whitewashed, few cobwebs ... .. nil.

(b) Fowl-house, low and dark ... .. nil.

(c) Cellars extensive, low-roofed, under mill house ... .. nil.

(d) Loft situated above (a), but not newly whitewashed, cobwebs numerous ... .. nil.

(e) One stone-built shelter, used as a fowl run ... .. nil.





PHOTOGRAPH NO. 10



PHOTOGRAPH NO. 11

At the back of the town:—

(a) Stable, small, dark, flat-roofed, warm, numerous large cobwebs ... ..	nil.
(b) Outhouse adjoining, lighter and cooler ... ..	nil.
(c) Loft above (a) and (b), dark, warm, wood-roofed ...	nil.

(20) GLEN GARWICK ROAD, November 19th.

(a) One stable, disused ... ..	nil.
(b) One loft, above (a) ... ..	nil.

(21) GLEN GROUDLE, October 30th, November 15th and 16th.

(a) One cowshed, situated 15 yards from a cottage (Photo. 7) and 100 yards from a breeding-place of *A. bifurcatus* was examined. It was gable-roofed but dark, low, warm and had many cobwebs. The door was central in the side wall, and at one end two cows were kept, the other end being a coal and wood store. There were captured here, distributed equally over both ends of the shed, but less numerous just at the door ... .. 147 ♀

(b) One stable for two horses, dark, flat-roofed, moderately warm, but draughty... .. 22 ♀

(c) Three latrines near stable ... .. nil.

(d) Four cellars situated near stable, two in house and two under verandah ... .. nil.

(e) Three outhouses ... .. nil.

(f) One loft over (b), communicating with the stable by an opening two feet square above the manger, and by ladder entrance also, well-lighted, clean and airy, recently renovated roof of corrugated iron, few cobwebs, draughty ... .. nil.

(g) Two sheds, corrugated iron, a few yards from stable, containing piles of wood ... .. nil.

(h) One shelter (public) in glen ... .. nil.

(i) One kennel ... .. nil.

(22) GLEN SULBY, December 7th.

Two cowsheds:—

(a) One very small, two animals, gabled, corrugated iron roof, dark, warm, the roof moist, cobwebs very numerous ... 9 ♀

(b) Similar but wood-roofed, recently swept, few cobwebs nil.

## (23) KIRKMICHAEL, December 7th.

- (a) Three cowsheds, flat-roofed wood, dark, warm, clean, to hold twenty, eight, four animals, respectively ... .. nil.
- (b) One pigstye, usual type, dark, fairly warm, cobwebs numerous ... .. nil.
- (c) One loft above largest cowshed, high gable roof, dark, warm, many cobwebs ... .. nil.

## (24) PEEL TO ST. JOHN'S, December 8th.

- (a) Two cowsheds:—
- (i) Large, sixteen animals, flat-roofed, warm, cobwebs over mangers and in corners only ... .. 4 ♀
- (ii) Large, ten animals, flat-roofed, dark, few cobwebs, except in corners ... .. 17 ♀
- (b) Two stables:—
- (i) Flat wood roof, warm, dark, few cobwebs ... .. 2 ♀
- (ii) Similar but more cobwebs ... .. nil.
- (c) One latrine outside house ... .. nil.
- (d) One loft above (a) (ii); high gable roof, cool and airy, containing straw and hay ... .. nil.

## (25) PORT ERIN, November 26th and 29th.

- (a) Four cowsheds:—
- (i) Two, low flat wood roof, dark, warm ... .. nil.
- (ii) Two, iron roof, low, warm, moist, dark ... .. nil.
- (b) Three stables, dark, unventilated, cooler than cowsheds. In one ... .. 1 ♀
- (c) One pigstye, low, dark, wood roof, many cobwebs ... .. nil.
- (d) Two fowl-houses, thatched low ... .. nil.
- (e) One loft above (a) (i), dark, cool ... .. nil.

## (26) PORT ST. MARY, November 29th.

- (a) Two cowsheds, large, dark, gable, slate roof recently limewashed, few cobwebs ... .. nil.
- (b) One outhouse, continuation of cowshed, cold, draughty ... .. nil.
- (c) Two sheds, one for straw, one for carts ... .. nil.

(27) RAMSEY, November 22nd, 23rd and 24th.

(a) Four cowsheds:—

- (i) One for six animals, low wood roof, dark, warm ... .. 1 ♀
- (ii) Three, first rather light, cool, corrugated iron roof; second and third warm, low wood roof, dark; in third ... .. 3 ♀

(b) Four stables:—

- (i) One large, airy, high corrugated iron roof, few cobwebs, accommodation for about fifty horses ... 1 ♀
- (ii) Two, small, wood roof, dark, with cobwebs... nil.
- (iii) One, airy, light, cool, wood roof, cobwebs numerous ... .. nil.

(c) Six pigsties; usual type, in each of two, one female.

Total ... 2 ♀

*Anopheles plumbeus*, Steph.

(29) BALLASALLA, December 9th.

*Sycamore*. A breeding-place was found just outside the churchyard of the Abbey Church, between it and the river. The tree was situated a few yards from the road. The aperture was at a height of 5 feet from the ground and  $1\frac{1}{2}$  inches in diameter, depth of hole 6 inches; the water was yellow tinged.

(30) BALLAUGH, December 6th.

*Sycamore*. In the farmstead of Mr. Kneen a breeding-place of this mosquito was found in a tree situated about 30 yards from the dwelling-house. The aperture, situated 8 feet from the ground, was 6 inches in diameter and the depth of the cavity 12 inches. Small larvae only were found.

(31) DOUGLAS, October 30th, November 18th, December 3rd.

Seven breeding-places were found in and near Douglas. On the previous visit, October 30th, two breeding-places, (a) (b), were found in the small glen behind Falcon Cliff Hotel.

October 30th:—

(a) *Sycamore*, situated 15 yards from the garage and 27 yards from the main road. Aperture at  $1\frac{1}{2}$  feet from the ground, diameter

about 6 inches, depth 9 inches. The whole trunk was hollow. Large and small larvae numerous.

(b) *Sycamore*, 60 yards from garage and 10 and 12 yards, respectively, from two roads. Aperture 1 foot from ground, hole 9 inches deep; small larvae.

November 18th:—

(c) *Sycamore* in garden of Nunnery Mill Cottage, situated 12 yards from house. Aperture 12 feet from ground, measuring 2 by  $1\frac{1}{2}$  inches, numerous larvae.

(d) *Lime* in paddock below cottage and mill. Situated 30 yards from house and 15 yards from the mill.

(e) *Sycamore* just outside garden of Mill Cottage. Aperture about 4 feet from ground, with a smaller aperture 3 feet from the ground almost level with the water. Owing to difficulties in either siphoning or scooping out the water in this cavity, resort was had to flushing out the larvae by pouring a bucket of water into the upper opening and catching the water as it emerged from the lower opening.

December 3rd:—

(f) *Sycamore* situated in garden of Marina Terrace, at the junction of two streets and distant 20 yards from an elementary school (Photo. No. 10). Aperture at 2 feet from ground 5 by 3 inches in size and cavity 6 inches deep.

(g) *Sycamore* in same garden 5 yards from the previous one. Aperture 2 feet from ground 8 by 5 inches, depth 2 feet; small larvae numerous.

(32) GLEN GROUDLE, November 19th.

*Spanish Chestnut*. Just where the bridge on the high road crosses the Groudle river, a very large breeding-place was found. The aperture, which is at 10 feet from the ground, appears over the parapet of the bridge and is 9 inches in diameter, the cavity being full of red water to within 2 inches of the lip of the aperture.

(33) LAXEY, November 20th.

*Spanish Chestnut*. In LaxeY Glen Gardens, on the right side of the arena in front of the bandstand, are some trees on a slightly raised terrace; in one of these, larvae were found; aperture at  $6\frac{1}{2}$  feet

from the ground, 3 inches in diameter and facing upwards, depth of cavity 15 inches.

(34) GLEN SULBY, December 7th.

*Ash.* Breeding-place found in this locality is of exceptional interest. In an area situated 400 yards from the Glen Hotel, where many trees had recently been cut down, larvae were found in the stump of an ash tree. The aperture is a foot in diameter, but before water is reached at 18 inches from the top of the stump the cavity has widened greatly, so that the surface of the water is very much larger than the aperture of entrance. Not only so, but also the cavity extends downwards until it is much below the level of the ground. That the breeding-place is a true rot-hole, and entirely contained in the tree stump, is shown by the facts that it was impossible to push a stick down through it at any place, and that the water was deep red in colour; it contained numerous larvae of *Myiatropa florea* and various chironomids (Photo. No. 8). This photograph is further of interest because the marshy ground below, indicated by arrow, is a breeding-place of *A. bifurcatus*.

(35) KIRK BRADDAN, December 10th.

*Sycamore.* Near Braddan Church, a tree was found with a cavity containing larvae. It stood on a bank behind the Hotel at a distance of 20 yards. Two apertures were present about 4 feet from the ground and about 5 inches in diameter.

(36) KIRK MICHAEL, December 7th.

*Spanish Chestnut.* The breeding-place found here was in a tree situated in a field to the right of the road leading to a farm (Mr. Mylchreest), and distant 12 yards from the cowsheds and 80 yards from the White House. The aperture was at a height of 7 feet and was remarkably small, about 1 inch. By means of the siphon, however, a great rush of red water was obtained from a large cavity, with larvae in numbers.

(37) PEEL, December 8th.

*Spanish Chestnut.* The nearest point at which *A. plumbeus* was found was the estate of Ballamore. The tree was situated beside the main road. The aperture was 9 feet from the ground and 8 inches in diameter, depth 6 inches.



(38) RAMSEY, November 23rd.

On the estate of Miltown, outside Ramsey, two breeding-places were found.

(a) *Sycamore*, situated 15 yards to left side of Ramsey Road. Aperture at 10 feet from ground 6 by 7 inches, depth 2 feet, the water surface being about 1 foot from lip of aperture; numerous larvae

(b) *Sycamore*. In close proximity to the foregoing, aperture at 8 feet from ground, 12 inches in diameter, a very large cavity full of a pulpy mass of débris, with a layer of water on the top.

(39) ST. JOHN'S, December 8th.

At a house on the St. John-Knockaloe Road, just beyond Ballamore estate on the left of the road, two breeding-places in sycamores were found.

(a) *Sycamore*. This was situated 20 yards from cowsheds and 30 yards from house; aperture at 4 feet from ground, 9 by 4 inches, depth 9 inches; trunk above hole also hollow for more than 18 inches up; numerous larvae, over twenty in the first scoopful of water taken out.

(b) *Sycamore*. Standing immediately beside a latrine, 15 yards from the house. There was a large cavity with two apertures, each about 5 to 6 inches in diameter (Photo. No. 9).

#### *Culex pipiens*, L.

Hibernating females were found in the following places:—Douglas, in 1 stable, 1 fowl-house, 1 cellar, 1 loft, 2 shelters, 1 latrine; Glen Garwick Road, 1 stable, 1 loft; Groudle Glen, 1 outhouse, 2 latrines, 2 cellars, 1 loft, 2 sheds; Port St. Mary, 1 shed; Ramsey, 3 cowsheds, 2 stables, 3 piggeries, 1 loft, 1 shed.

#### *Theobaldia annulata*, Schr.

Hibernating females were found:—Groudel Glen, 1 cellar, 1 loft, 1 latrine, 1 open shelter; Kirkmichael, 1 cowshed.

Pupae. Douglas, Nunnery Mill Cottage, in wooden tub (see photo. 11). Ramsey, in association with larvae of *A. bifurcatus* (Appendix, No. 15).

MAP  
SHOWING DISTRIBUTION OF  
MOSQUITOES  
IN THE  
ISLE OF MAN

- *A. bifurcatus*
- ⊕ *A. maculipennis*
- *A. plumbeus*
- × *C. pipiens*
- ▲ *T. annulata*
- △ *C. moritani*
- △ *C. fumipennis*



Larvae. Ballaugh, under  $\frac{1}{8}$ -inch ice in peat bog and pond in field; Castletown, ditch; Glen Garwick, concrete artificial pond; St. John's, manure pit; Port Erin, marshy field; Ramsey, see above, under pupae.

*Culicella morsitans*, Theo.

Larvae. Ballaugh, under  $\frac{1}{8}$ -inch ice in pond in field and peat bog, in association with *T. annulata* and *C. fumipennis* larvae; Douglas, marshy field; Glen Garwick Road, marshy field; Glen Sulby, marsh.

*Culicella fumipennis*, Steph.

Larvae. Ballaugh, as above, under *C. morsitans*.

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